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# YouTube as a source of information about apical resection: a metadological study

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## ABSTRACT

**Aims:** This study aims to evaluate the use of YouTube as a source of information about apical resection, using a methodological approach.

**Methods:** The search term " apicectomy " was identified using the Google Trends application. On 18th January 2024, between 10:00 and 13:00, the term "apicectomy" was searched on YouTube videos. The URLs of the first 250 videos were copied and the 53 videos that met the inclusion criteria were evaluated and scored for Global Quality Score (GQS), Modified DISCERN (mDISCERN) scale and completeness. Statistical analysis was conducted using descriptive statistics, as well as the Shapiro-Wilk and Mann-Whitney U tests.

**Results:** Of the 53 videos analysed, 5 were found to have excellent content, 30 were found to have average content and 18 were found to have poor content. Videos uploaded by dentists/specialists had significantly higher numbers of views, longer durations, more likes, comments, and view rates compared to those uploaded by commercial and other sources ($p<0.05$). GQS, DISCERN, definition, indication, surgical technique, retrograde filling materials, prognosis and total score were significantly higher in the dentist/expert source compared to commercial and other sources ($p<0.05$).

**Conclusion:** The level of excellence of YouTube videos on apical resection was found to be "moderate". All videos with an excellent content level were uploaded by a dentist/specialist source. More comprehensive and informative videos about apical resection in dentistry should be uploaded to YouTube by dentists and specialists.

**Keywords**: Apicectomy, endodontics, internet, social media, YouTube

## INTRODUCTION

Apical resection, also known as apicectomy, root apex resection, or root amputation, is the process of cleaning a lesion that develops in the periapical tissues of the tooth, cutting the infected root apex, and covering it with a retrograde filling material.[1,2] The objective of this procedure is to eradicate the infection in the apical region and seal the root canal system, thereby preserving the tooth's function and aesthetics and enabling it to remain in the mouth for as long as possible.[1,3]

Apical resection is indicated in root fractures located in the apical third, when a pathology involves 1/3 of the root tip, when the root canal is occluded or has extruded paste or gutta-percha, in teeth with perforated or lateral canals during treatment, and in cases where root canal re-treatment is not appropriate.[3,4] Prior to performing apical resection, it is essential to evaluate the restorative and periodontal status of the tooth, the size of the periapical lesion, its relationship with anatomical structures, the presence of vertical root fracture and traumatic occlusion, and the patient's systemic suitability for the operation.[1,5]

Success rates for apical resection vary between 44% and 95%.[1,6,7] It is not advisable to determine the success of apical resection based on X-ray images taken in a short time since radiological ossification may take between 6 months and 1 year to complete. In some cases, the radiolucent image may even indicate healthy scar tissue.[1,8] Recurrence of the lesion may be indicated by symptoms such as swelling, pain, and pus around the apex during clinical examination, as well as the presence of radiolucency that increases in size during radiological examination. In such cases, options such as reapplication of periapical surgery, reimplantation, or tooth extraction may be considered.[1,2,8]

In the current digital age, numerous individuals utilise various online platforms to access health-related information.[9] The internet is widely regarded as a valuable source of health information, with many people conducting research on their health status online.[10] YouTube, a free online video sharing social media platform with over 1 billion users, is one such platform.

Since its establishment in 2005, over 5 billion videos have been uploaded to YouTube, which is used by approximately

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1.9 billion people per month. Patients often prefer YouTube over other social media platforms due to its provision of visual and audio information.[11] However, the accuracy of YouTube videos is being questioned due to the proliferation of video sources and their potential influence on patients.[12]

YouTube videos on medicine and dentistry have been evaluated in previous studies.[13-17] However, no study has been conducted to evaluate YouTube videos related to apical surgery using the keyword 'apicectomy'. Therefore, the aim of this study was to analyze the accuracy and reliability of the information obtained from YouTube videos on apical surgery.

## METHODS

Google Trends is a service that provides statistical information about word or phrase queries searched on Google. In this study, we used the search terms 'apicectomy', 'apical surgery', 'root resection' and 'apical resection' in the Google Trends application. We found that 'apicectomy' was the most frequently searched term on the topic. On 18th January 2024, a search was conducted on YouTube (http://www.youtube.com) between 10:00 and 13:00 to find videos on apical resection in endodontics using the search term 'apicectomy'. The search results were sorted by relevance, which is the default option on YouTube.

The first 250 videos found were included in this study. Two observers, each with at least 7 years of clinical experience in the field, rated these videos separately. 197 videos that had no visual or audio content, were not in English, were longer than 15 minutes, were uploaded more than ten years ago, were duplicates, or were irrelevant to the topic were excluded from the analysis. The remaining 53 videos that met the inclusion criteria were analysed by two observers. All video links were included, as search results may change over time after the exclusion criteria have been applied. Local ethics committee approval was not required for this study as the survey data are publicly available on YouTube. All procedures were carried out in accordance with the ethical rules and the principles.

A literature review was performed to assess the accuracy and timeliness of the videos. The investigators scored each video from 0-2 (0=incomplete, 2=very complete) according to the information content regarding the definition, indications, contraindications, surgical technique, retrograde filling materials and prognosis of apical resection, resulting in a total score of 12. According to the sum of the scores, the videos were classified as low content (0-4 points), medium content (5-8 points) and high content (9-12 points). Another scoring method used was the 5-point Global Quality Score (GQS) index (Table 1). The GQS is a 5-point Likert scale based on the quality, flow and usability of information available online. Videos were scored from 1 to 5 based on quality, usefulness to patients, flow, educational value and overall quality. The reliability and accuracy of the information presented in the videos was assessed using the 5-point Modified DISCERN (mDISCERN) scale, developed from the DISCERN reliability tool (Table 2).

The source from which all videos were uploaded, the duration of the video, the total number of views, the number of days since upload, the number of likes, the number of comments and the view rate were recorded. The view rate was calculated by dividing the number of views by the number of days since upload and multiplying by 100%. Videos were categorised according to their source as dentist/specialist, commercial and other. In cases where there was disagreement between the researchers on the classification and scoring of videos, a consensus was reached through an impartial and careful literature review.

**Table 1. Global quality score**

| Scores description |
|---|
| 1. Poor quality; Very unlikely to be of any use to patients |
| 2. Poor quality but some information present; Of very limited use to patients |
| 3. Suboptimal flow, some information covered but important topics missing; Somewhat useful to patients |
| 4. Good quality and flow, most important topics covered; Useful to patients |
| 5. Excellent quality and flow; Highly useful to patients |

**Table 2. The modified DISCERN score (1 point for every yes, 0 points for no)**

| Item Questions |
|---|
| 1.Are the aims clear and achieved? |
| 2.Are reliable sources of information used? (i.e., publication cited, speaker is specialist in diabetes) |
| 3.Is the information presented both balanced and unbiased? |
| 4.Are additional sources of information listed for patient reference? |
| 5. Are areas of uncertainty mentioned? |

### Statistical Analysis

Data analysis was performed using SPSS 21.0. Interobserver agreement was assessed using Fleiss kappa analysis. The normal distribution of the data was checked using the Shapiro-Wilk test, and the Mann-Whitney U test was used for pairwise comparisons because the parameters were not normally distributed. In the analyses, the confidence interval was set at 95% (significance level 0.05, $p<0.05$).

## RESULTS

The descriptive statistics of the video shares are presented in Table 3.

**Table 3. Descriptive statistics for YouTube videos**

| Quantitative variable | Min | Max | Mean | SD |
|---|---|---|---|---|
| Views | 23.00 | 900000.00 | 32864.11 | 131595.33 |
| Likes | 0.00 | 3300.00 | 194.25 | 608.63 |
| Comments | 0.00 | 477.00 | 24.74 | 75.14 |
| Duration | 0.48 | 14.90 | 3.64 | 3.34 |
| Days since upload | 90.00 | 3600.00 | 1743.96 | 991.61 |
| Viewing rate | 2.12 | 31250.00 | 1549.98 | 5332.25 |

Min: Minimum, Max: Maximum, SD: Standart deviation

The average length of YouTube videos on apical resection was 3.64 minutes. The videos had an average of 32,864 views (min:23/max:900,000) and a view rate of 1,549.98 (min:2.12/max: 31,250). The average number of likes was 194.25 (min:0/max:33,300) and the average number of comments was 24.74 (min:0/max:477). The videos were uploaded an average of 1,743.96 days ago (min:90/max:3,600) (Table 3).

Table 4 shows a comparison of the quantitative data of the videos based on their source category.

**Table 4. Comparison of quantitative data based on the source of uploaded videos**

| | Dentist/Specialist (n=33) | Commercial (n=11) | Other (n=9) | |
|---|---|---|---|---|
| **Quantitative variable** | **Mean ± SD** | **Mean ± SD** | **Mean ± SD** | **p** |
| Views | 51071.85±164976.23 | 1140.36±1903.09 | 4875.89±7544.63 | p<0.05[a] |
| Likes | 298.82±755.43 | 4.45±6.71 | 42.78±67.91 | p<0.05[a] |
| Comments | 34.91±91.46 | 0.18±0.40 | 17.44±43.91 | p<0.05[a,c] |
| Duration | 4.88±3.52 | 1.07±0.52 | 2.24±2.27 | p<0.05[a,b] |
| Days since upload | 1650.00±1005.90 | 1865.45±716.72 | 1940.00±1265.70 | >0.05 |
| Viewing rate | 2387.87±6647.11 | 58.57±72.01 | 300.53±600.54 | p<0.05[a] |

n: Number of videos, SD: Standart deviation, p: Significance level, a: Dentist/Speacialist≠Commercial, b: Dentist/Specialist≠Other, c: Commercial≠Other

Based on the video upload source, there were 33 videos in the dentist/specialist source, 11 videos in the commercial source, and 9 videos in other sources. The number of views followed the order of dentist/specialist, other, and commercial channels from highest to lowest (Table 4). No statistical difference was found in terms of the number of days elapsed based on the video source (p>0.05). Statistical differences were found in the number of views, video duration, number of likes, number of comments, and view rate based on the video source (p<0.05). Videos uploaded by dentists/specialists had significantly higher numbers of views, longer durations, more likes, comments, and view rates compared to those uploaded by commercial and other sources (Table 4).

Descriptive statistics of GQS, DISCERN and Information completeness scores are presented in Table 5. The weighted kappa value of interobserver agreement for GQS, DISCERN and completeness scores were 0.84, 0.80 and 0.80, respectively.

The mean GQS score of YouTube videos on apical resection is 3.81 (min:2/max:5), the mean DISCERN score is 4.02 (min:2/max:5), the mean disease description score is 1.17 (min:0/max:2), the mean indication score is 1.09 (min:0/max:2), the mean contraindication score is 0. 06 (min:0/max:2), the mean surgical technique score was 1.51 (min:1/max:2), the mean retrograde filling materials score was 0.92 (min:0/max:2), the mean prognosis score was 0.92 (min: 0 / max: 2) and the mean total score was 5.70 (min:2/max:11) (Table 5).

The comparison of completeness, GQS and DISCERN scores by source category is shown in Table 6.

There was no statistical difference in mean contraindication score according to video source (p>0.05) (Table 6). There was a statistical difference in GQS, DISCERN, disease definition, indication, surgical technique, retrograde fillers, prognosis and total score according to video source (p<0.05). GQS, DISCERN, definition, indication, surgical technique, retrograde filling materials, prognosis and total score were significantly higher in the dentist/expert source compared to commercial and other sources (Table 6).

Of the 53 videos analysed, 5 were found to have excellent content, 30 were found to have average content and 18 were found to have poor content. The comparison of the quantitative data of the videos according to the excellence of the videos is shown in Table 7.

According to the results of the comparison test according to the perfection status, no statistical difference was found in the number of views, number of likes, number of comments, number of days elapsed and view rates according to the perfection status of the videos (p>0.05). There was a statistical

**Table 5. Descriptive statistics for GQS, DISCERN an completeness scores**

| Scores | Min | Max | Mean | SD |
|---|---|---|---|---|
| GQS (1-5) | 2.00 | 5.00 | 3.81 | 0.98 |
| DISCERN (1-5) | 2.00 | 5.00 | 4.02 | 0.87 |
| Definition | 0.00 | 2.00 | 1.17 | 0.64 |
| Indication | 0.00 | 2.00 | 1.09 | 0.66 |
| Contraindication | 0.00 | 2.00 | 0.06 | 0.30 |
| Surgical technique | 1.00 | 2.00 | 1.51 | 0.50 |
| Retrograde filling materials | 0.00 | 2.00 | 0.92 | 0.87 |
| Prognosis | 0.00 | 2.00 | 0.92 | 0.70 |
| Overall score (0-12) | 2.00 | 11.00 | 5.70 | 2.10 |

SD: Standart deviation

**Table 6. Comparison of completeness, GQS and DISCERN scores according to the source of the uploaded videos**

| | Dentist/ Specialist (n=33) | Commercial (n=11) | Other (n=9) | |
|---|---|---|---|---|
| **Scores** | **Mean ± SD** | **Mean ± SD** | **Mean ± SD** | **p** |
| GQS (1-5) | 4.36±0.60 | 2.73±0.79 | 3.11±0.78 | p<0.05[a,b] |
| DISCERN (1-5) | 4.48±0.57 | 3.18±0.75 | 3.33±0.71 | p<0.05[a,b] |
| Definition | 1.30±0.59 | 0.64±0.50 | 1.33±0.71 | p<0.05[a,c] |
| Indication | 1.30±0.68 | 0.82±0.40 | 0.67±0.50 | p<0.05[a,b] |
| Contraindication | 0.09±0.38 | 0.00±0.00 | 0.00±0.00 | p>0.05 |
| Surgical technique | 1.73±0.45 | 1.09±0.30 | 1.22±0.44 | p<0.05[a,b] |
| Retrograde filling materials | 1.24±0.87 | 0.36±0.50 | 0.44±0.73 | p<0.05[a,b] |
| Prognosis | 1.12±0.70 | 0.55±0.52 | 0.67±0.71 | p<0.05[a] |
| Overall score (0-12) | 6.79±1.71 | 3.45±0.69 | 4.44±1.67 | p<0.05[a,b] |

n: Number of videos, SD: Standart deviation, p: Significance level, a: Dentist/Specialist≠Commercial, b: Dentist/Specialist≠Other, c: Commercial≠Other

**Table 7. Comparison of quantitative data of the videos according to the perfection status of the videos**

| | Excellent (n=5) | Medium/Poor (n=48) | |
|---|---|---|---|
| **Quantitative variable** | **Mean ± SD** | **Mean ± SD** | **p** |
| Views | 70275.40±153020.23 | 28967.10±130393.30 | p>0.05 |
| Likes | 642.40±1319.57 | 147.56±487.91 | p>0.05 |
| Comments | 100.20±210.82 | 16.88±42.38 | p>0.05 |
| Duration | 6.54±2.99 | 3.34±3.26 | p<0.05 |
| Days since upload | 1008.00±591.54 | 1820.63±997.24 | p>0.05 |
| Viewing rate | 4959.10±10582.46 | 1194.86±4534.49 | p>0.05 |

n: Number of videos; SD: Standart deviation; p: Significance level

difference in video duration according to perfection status (p<0.05). The video duration of the videos in excellent condition was significantly higher than the video duration of the videos in fair/poor condition (Table 7).

The comparison of completeness, GQS and DISCERN scores according to the excellence of the videos is shown in Table 8.

**Table 8. Comparison of completeness, GQS and DISCERN scores according to the excellence of the videos**

| | Excellent (n=5) | Medium/Poor (n=48) | p |
|---|---|---|---|
| Scores | Mean ± SD | Mean ± SD | |
| GQS (1-5) | 4.80±0.45 | 2.94±0.87 | p<0.05 |
| DISCERN (1-5) | 4.80±0.45 | 3.33±0.84 | p<0.05 |
| Definition | 2.00±0.00 | 0.78±0.65 | p<0.05 |
| Indication | 1.80±0.45 | 0.61±0.50 | p<0.05 |
| Contraindication | 0.40±0.89 | 0.00±0.00 | p>0.05 |
| Surgical technique | 2.00±0.00 | 1.11±0.32 | p<0.05 |
| Retrograde filling materials | 1.80±0.45 | 0.39±0.61 | p<0.05 |
| Prognosis | 1.40±0.55 | 0.56±0.51 | p>0.05 |
| Overall score (0-12) | 9.40±0.89 | 3.44±0.62 | p<0.05 |

n: Number of videos, SD: Standart deviation, p: Significance level

According to the results of the comparison test performed according to the perfection status, no statistical difference was detected according to the perfection status of the videos in terms of mean scores for contraindication and prognosis (p>0.05) (Table 6). There was a statistical difference in the GQS, DISCERN, definition, indication, surgical technique, retrograde cavity materials and total scores according to the perfection status of the videos (p<0.05). The GQS, DISCERN, definition, indication, surgical technique, retrograde cavity materials and total scores of excellent videos were significantly higher than those of moderate/poor videos (Table 8).

The relationship between completeness, GQS and DISCERN scores of videos and quantitative data is shown in Table 9. A positive and significant (p<0.05) relationship was found between GQS score and number of views, number of likes, number of comments, video duration, and view rate (Table 9). A positive and significant (p<0.05) relationship was found between DISCERN score and the number of views, number of likes, number of comments, video duration and view rate (Table 9). A positive and significant (p<0.05) relationship was found between total score and the number of views, number of likes, number of comments, video duration and view rate (Table 9).

## DISCUSSION

It is widely acknowledged that communication is predominantly facilitated through the internet and social media. Additionally, individuals often seek advice on health-related matters from online sources. Individuals search social media accounts for health information and reviews, but these sources may contain incorrect or incomplete information. Therefore, it is important to access up-to-date and reliable sources for accurate and comprehensive health information.[18] At this point, there are many studies in the fields of dentistry and medicine in which content analysis is made of videos uploaded to YouTube, which is a widely used area.[13-20] But, no other study has analysed English YouTube videos related to apical resection using the keyword apicectomy. Our study is the first to analyse the usefulness of English videos on YouTube about apical resection, making it an original study.

Fifty-three videos that met the inclusion criteria were included in our study among the first 250 videos accessed when "apisectomy" was typed into the YouTube search engine. There are various studies in the literature that use a similar number of videos as our study.[13-15] Various filters are available for sorting videos, including 'views', 'upload date', and 'video duration'. For this study, the default filter for YouTube search was 'sort by relevance', as it Because this is the most commonly used option by invudials. Furthermore, 'sort by relevance' was found to be the most preferred filtering option in these studies.[20-24]

Many studies[14,25,26] that have evaluated the quality of health-related YouTube videos have reported that the videos contain

**Table 9. Comparison of completeness, GQS and DISCERN scores with quantitative data**

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. GQS | 1 | | | | | | | | | | | | | | |
| 2. DISCERN | 0.67** | 1 | | | | | | | | | | | | | |
| 3. Definition | 0.41** | 0.26 | 1 | | | | | | | | | | | | |
| 4. Indication | 0.52** | 0.42** | 0.42** | 1 | | | | | | | | | | | |
| 5. Contraindication | 0.15 | 0.25 | 0.11 | 0.28* | 1 | | | | | | | | | | |
| 6. Surgical technique | 0.48** | 0.50** | 0.26 | 0.21 | 0.00 | 1 | | | | | | | | | |
| 7. Retrograde filling materials | 0.57** | 0.51** | 0.05 | 0.12 | 0.02 | 0.61** | 1 | | | | | | | | |
| 8. Prognosis | 0.30* | 0.23 | -0.20 | 0.09 | 0.16 | 0.16 | 0.17 | 1 | | | | | | | |
| 9. Overall score | 0.78** | 0.66** | 0.48** | 0.61** | 0.23 | 0.70** | 0.67** | 0.46** | 1 | | | | | | |
| 10. Views | 0.41** | 0.47** | 0.29* | 0.33* | 0.16 | 0.43** | 0.37** | 0.00 | 0.50** | 1 | | | | | |
| 11. Likes | 0.46** | 0.50** | 0.37** | 0.37** | 0.19 | 0.56** | 0.45** | 0.10 | 0.64** | 0.89** | 1 | | | | |
| 12. Comments | 0.52** | 0.37** | 0.29* | 0.24 | 0.16 | 0.32* | 0.34* | 0.23 | 0.53** | 0.76** | 0.81** | 1 | | | |
| 13. Duration | 0.56** | 0.55** | 0.33** | 0.31** | 0.28** | 0.63** | 0.59** | 0.39** | 0.79** | 0.58** | 0.74** | 0.71** | 1 | | |
| 14. Days since upload | -0.06 | 0.00 | -0.13 | -0.05 | 0.02 | -0.03 | -0.04 | -0.18 | -0.14 | 0.37** | 0.20 | 0.17 | -0.08 | 1 | |
| 15. Viewing rate | 0.46** | 0.49** | 0.35* | 0.36** | 0.15 | 0.50** | 0.39** | 0.07 | 0.58** | 0.94** | 0.91** | 0.78** | -0.22 | 0.08 | 1 |

*: p<0.05, **: p<0.01

insufficient information. In this study, the videos were found to have moderate quality information content. This could be attributed to the fact that the majority of the installers were professionals, which is in line with Yavuz et al.'s[27] study.

Singh et al.[28] developed the mDISCERN Score to estimate the reliability and clarity of information in YouTube videos. In this study, we used the mDISCERN Score to investigate the reliability and accuracy of videos. The quality of patient information was assessed using the global quality scale (GQS), consistent with previous studies.[13,14] Furthermore, the quality and accuracy of the information presented in the videos were evaluated using the completeness score, as in previous studies.[13,14,17] The GQS and DISCERN scores of the dentist/expert upload source were significantly higher than those of commercial and other sources. Additionally, the GOS, DISCERN, and completeness scores of the dentist/expert source were statistically higher than those of all other sources. Consistent with previous studies,[14,16,17] it is expected and acceptable that videos uploaded by dentists and specialists have higher quality, accuracy, and completeness scores than those uploaded by other sources.

Viewers on YouTube can interact with videos by liking and commenting. However, these interactions should not be considered reliable evidence for dentistry. Nonetheless, dentists can use these features to gauge the usefulness of their videos and share more informative content.

Like previous studies,[29-31] the study used GQS, DISCERN and completeness scores; the relationship between the number of views, the number of likes, the number of comments, the video duration and the viewing rate was examined and a positive and significant relationship was detected. It is worth noting that the ranking of videos on YouTube can affect viewers' engagement.[15] However, it is expected that higher quality videos receive more interaction as they are discovered, which is compatible with the YouTube algorithm.

### Limitations

One limitation of this study is that the results may vary depending on the selected keywords. In this study, we selected the single most popular keyword based on Google Trends application data. The lack of overlap between the results of the study examining apical resection videos with multiple keywords is likely due to this important difference.[32] It should be noted that the data collection method used in this study was ad hoc, which is a limitation shared with similar studies.[14,16,17] Additionally, the study's results are limited as only English videos were included. It is important to consider that there are many countries where English is not the native language.

Out of the 53 videos that were examined, it was determined that 5 of them were excellent, 30 were average, and 18 were poor. Based on the findings of this study, it can be concluded that YouTube may be a moderately useful source of information for apical resection.

## CONCLUSION

The level of perfection of YouTube videos on apical resection was found to be 'medium'. All videos with an excellent content level were uploaded by a dentist/specialist source. The quality and accuracy of videos about apical resection uploaded by dentists and specialists are higher than those uploaded by other sources. More comprehensive and informative videos about apical resection in dentistry should be uploaded to YouTube by dentists and specialists.

## ETHICAL DECLARATIONS

### Ethics Committee Approval

No ethics committee decision is required for this study.

### Informed Consent

No informed consent is required for this study.

### Referee Evaluation Process

Externally peer-reviewed.

### Conflict of Interest Statement

The authors reports no conflicts of interest in this work.

### Financial Disclosure

The authors declared that this study has received no financial support.

### Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

## REFERENCES

1. von Arx T. Apical surgery: a review of current techniques and outcome. *Saudi Dent J*. 2011;23(1):9-15.
2. Lieblich SE. Current concepts of periapical surgery: 2020 update. *Oral Maxillofac Surg Clin North Am*. 2020;32(4):571-582.
3. Jang Y, Hong HT, Chun HJ, Roh BD. Influence of apical root resection on the biomechanical response of a single-rooted tooth-part 2: apical root resection combined with periodontal bone loss. *J Endod*. 2015;41(3):412-416.
4. von Arx T, Janner SF, Jensen SS, Bornstein MM. The resection angle in apical surgery: a CBCT assessment. *Clin Oral Investig*. 2016;20(8):2075-2082.
5. Naumann M, Adali U, Rosentritt M, Happe A, Frankenberger R, Sterzenbach G. Effect of apical root resection, orthodontic extrusion, and surgical crown lengthening on load capability. *Clin Oral Investig*. 2023;27(8):4379-4387.
6. Ekici Ö, Aslantaş K, Kanık Ö, Keles A. Temperature and time variations during apical resection. *Acta Odontol Scand*. 2021;79(2):156-160.
7. Angerame D, De Biasi M, Lenhardt M, et al. Root-end resection with or without retrograde obturation after orthograde filling with two techniques: a micro-CT study. *Aust Endod J*. 2022;48(3):423-430.
8. von Arx T, Steiner RG, Tay FR. Apical surgery: endoscopic findings at the resection level of 168 consecutively treated roots. *Int Endod J*. 2011;44(4):290-302.
9. Deniz S. Investigation of individuals' e-health literacy and cyberchondria levels. *İnsan İnsan Derg*. 2020;5(24):84-96.
10. McMullan M. Patients using the Internet to obtain health information: how this affects the patient-health professional relationship. *Patient Educ Couns*. 2006;63(1-2):24-28.
11. Al-Silwadi FM, Gill DS, Petrie A, Cunningham SJ. Effect of social media in improving knowledge among patients having fixed appliance orthodontic treatment: a single-center randomized controlled trial. *Am J Orthod Dentofacial Orthop*. 2015;148(2):231-237.
12. Madathil KC, Rivera-Rodriguez AJ, Greenstein JS, Gramopadhye AK. Healthcare information on YouTube: a systematic review. *Health Informatics J*. 2015;21(3):173-194.
13. Hançerlioğulları D, Türkyılmaz A, Barış SD, Erdemir A. YouTube as an information and education source for use of mineral trioxide aggregate in endodontics: quality and content analysis. *Turkish Endodontic J (TEJ)*. 2023;8(2):57-61.
14. Bariş K, Karşiyaka Hendek M, Olgun E. Evaluation of the quality of peri-implantitis videos on YouTube. *J Craniofac Surg*. 2023;34(6):1813-1816.

15. Özbay Y, Çırakoğlu NY. YouTube as an information source for instrument separation in root canal treatment. *Restor Dent Endod*. 2021;46(1):8.
16. Staziaki PV, Santo IDO, Skobodzinski AA, Park LK, Bedi HS. How to use YouTube for radiology education. *Curr Probl Diagn Radiol*. 2021; 50(4):461-468.
17. Nickles MA, Pavelka M, Mervak JE. Onychomycosis on YouTube: a cross-sectional analysis. *Skin Appendage Disord*. 2022;8(4):307-311.
18. Hucíková A, Babic A. Medical informatics idle YouTube potential. S*tud Health Technol Inform*. 2017;238:132-135.
19. McMahon KM, Schwartz J, Nilles-Melchert T, Ray K, Eaton V, Chakkalakal D. YouTube and the achilles tendon: an analysis of internet information reliability and content quality. *Cureus*. 2022;14(4):e23984. doi:10.7759/cureus.23984
20. Turco C, Collà Ruvolo C, Cilio S, et al. Looking for cystoscopy on YouTube: are videos a reliable information tool for internet users? *Arch Ital Urol Androl*. 2022;94(1):57-61. doi:10.4081/aiua.2022.1.57
21. Tamošiūnaitė I, Vasiliauskas A, Dindaroğlu F. Does YouTube provide adequate information about orthodontic pain? *Angle Orthod*. 2023;93(4):403-408. doi:10.2319/072822-527.1
22. Menziletoglu D, Guler AY, Isik BK. Are YouTube videos related to dental implant useful for patient education? *J Stomatol Oral Maxillofac Surg*. 2020;121(6):661-664.
23. Atilla AO, Öztürk T. Evaluation of YouTube internet platform that can be used as information source for upper jaw expansion procedure with video analysis. *Selcuk Dent J*. 2020;7(3):494-499.
24. Şahin SC. Evaluation of YouTube videos on porcelain laminate veneers. *Acta Odontol Turc*. 2021;38(1):19-27.
25. Hassona Y, Taimeh D, Marahleh A, Scully C. YouTube as a source of information on mouth (oral) cancer. *Oral Dis*. 2016;22(3):202-208.
26. Oremule B, Patel A, Orekoya O, Advani R, Bondin D. Quality and reliability of YouTube videos as a source of patient information on rhinoplasty. *JAMA Otolaryngol Head Neck Surg*. 2019;145(3):282-283.
27. Yavuz MC, Buyuk SK, Genc E. Does YouTube™ offer high quality information? Evaluation of accelerated orthodontics videos. *Ir J Med Sci*. 2020;189(2):505-509.
28. Singh AG, Singh S, Singh PP. YouTube for information on rheumatoid arthritis—a wakeup call? *J Rheumatol*. 2012;39(5):899-903.
29. Gaş S, Zincir OO, Bozkurt AP. Are YouTube videos useful for patients interested in botulinum toxin for bruxism? *J Oral Maxillofac Surg*. 2019;77(9):1776-1783.
30. Hutchison CM, Cave V, Walshaw EG, Burns B, Park C. YouTube™ as a source for patient education about the management of dental avulsion injuries. *Dent Traumatol*. 2020;36(2):207-211.
31. ElKarmi R, Hassona Y, Taimeh D, Scully C. YouTube as a source for parents' education on early childhood caries. *Int J Paediatr Dent*. 2017;27(6):437-443.
32. Er N, Çanakçı BC. Quality assessment of apical resection videos on YouTube: a joint study of oral surgery and endodontics. *Euroasia J Math, Engineering, Nat Med Sci*. 2023;10(28):184-196.